ELECTRONIC DEVICE WITH A SLIDING LID

FIELD OF THE INVENTION

The present invention relates to electronic devices with a sliding lid, particularly to the structure of a handheld electronic device with a sliding lid.

BACKGROUND OF THE INVENTION

Due to the development of electronics, today it is possible to manufacture smaller and smaller electronic devices for a variety of uses, for example, for use as mobile phones, positioning devices and remote controls. Although the small size of a device makes it easier to carry and store it, less space is left for the parts of a user interface required for use. Therefore, when designing such devices the aim is to take into consideration the requirements that are contradictory to each other with regard to the minimisation of the size of the device, on one hand, and as clear a user interface as possible when considering the comfort of use and usability, on the other hand. For example, when the outer surface of a mobile station becomes smaller less and less space is left for the keys and the display intended for its use. As for the comfort of use and usability, however, it is essential that a mobile station has a large display and good-sized keys. When using a mobile station for WWW-browsing and transferring images or a moving picture, the need for a large display and a good user interface is emphasised. One way to manufacture a small-sized electronic device without simultaneously limiting the size of the display and that of the keyboard too much is to combine the display and the keyboard by using a touch screen. On the other hand, it is possible to arrange a better contact with push buttons than with a touch screen. In addition, with push buttons, adjacent keys can normally be distinguished from each other better than with a touch screen and the number of incorrect keying can be reduced. The reading of the display is not impeded even if the push buttons become dirty and/or scratched because one does not have to see through them. The wearing of a touch screen, on the other hand, impedes the use of the display.

In some mobile station models attempts have been made to solve the problems presented above by constructing a device that comprises two hinged parts. A flap can protect a touch screen from becoming scratched, as is presented in the patent application publication GB 2 291 560. In some of these, a hinge is placed in the lower part of the device around which a flap opens up revealing the keys that are underneath it, in a shelter. However, a hinged flap always increases the size of a device in the same way, without adjustability. FIG. **1** shows a combination of a wireless telephone and a pocket calculator according to the patent publication DE 33 23 858, which has three parts hinged to each other. However, in the solution a set of conductors must be led from one part to another, because there an antenna **9** and the speaker of the earpiece are in a part **3**, a keyboard **5,6** and a display **7** are in a body **1** and the microphone is in a part **2**. Particularly, taking the antenna cable from one turning part to another is a problematic task. The antenna conductor must be protected by a conducting sheath surrounding the conductor. Normally, this is implemented by using a coaxial cable, where the antenna conductor is surrounded by an insulator and the insulator is surrounded by a conductor web. Such a cable is more sensitive to bending than a single-layer cable. Neither can the device be used without first opening the device. It is difficult to open the device, because a body **2** of

the device is covered with opening parts **2** and **3**. A user must either hold the device by the lower edge of the body, however, without preventing the opening of the parts **2** and **3** or, alternatively, open the parts **2** and **3** in turn. The device is also shaky when opened unless some kind of a lock is connected to the hinges, which again leads to a mechanically complex structure.

One solution where the size of a mobile phone is increased adjustably is known, e.g. from Nokia™ 8110 and 8810 GSM phones, wherein approximately one half of the lid of the device slides aside revealing the keys. In a Nokia™ 8810 GSM phone, one part of the keys are all the time visible and the other part of the keys remain concealed underneath a closed lid and are again revealed when the lid is slid aside. The solution is good in that it allows opening carried out by a one-hand grip but when moving the lid by a one-hand grip, e.g. the thumb, it is difficult to extend the length of the path so much that the user-can easily reveal a significant extent of the user interface, e.g. the keys or the touch screen.

SUMMARY OF THE INVENTION

Now an electronic device with a sliding lid has been invented, which device has at least two slideable elements, which are arranged to move in relation to the body of the device and to be moved with a single movement.

According to the invention, a portable electronic device is provided, comprising:

- a body;
- a first element slideably fitted to move in relation to the body between a first position and a second position;
- a user interface comprising a set of keys and a display, the display having a visible part; characterised by the device having:
  - a second element slideably fitted to move in relation to the body between a third position and a fourth position;
  - a first configuration, in which the visible part of the display is reduced; and
  - a second configuration, in which the visible part of the display is extended.

As an advantage of the invention, the user interface of an electronic device can be extended and reduced with one hand without having to move the elements that limit the user interface one by one. In addition, sensitive components of a device according to the invention can be protected for the duration of transport and storage by sliding a protecting surface in front of them. Furthermore, as an advantage of the invention, it is possible to construct a device to be collapsed in a small space, whereupon it takes less space and is easier to carry, e.g. in a pocket. With the help of the invention, it is possible to construct a small-sized mobile station that is easy to carry with without impeding the use of the mobile station, e.g. in browsing www-pages known from the Internet. The use of moving elements according to the invention also allows an adjustable distance between the microphone and the earpiece.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following, the invention will be explained in detail by referring to the enclosed drawings, in which

FIG. **1** shows a wireless telephone of the patent publication DE 33 23 858;

FIG. **2** shows a mobile station according to a first embodiment of the invention when closed, viewed from above;